



Knowledge, Attitude, and Practice of Parents Regarding Antibiotic Usage in Treating Children's Upper Respiratory Tract Infection at Primary Health Clinic in Kuala Lumpur, Malaysia: Pilot Study

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Abstract

Objectives: To assess the knowledge, attitude, and practice of parents regarding antibiotic usage for treating upper respiratory tract infection (URTI) among children.

Methods: A cross-sectional study was conducted among 320 randomly selected parents attending a primary health clinic using self-administered questionnaires.

Results: About two-thirds (69.1%) of the parents had poor knowledge level. Only 25.2% and 21.6% of the parents could correctly identify amoxicillin and penicillin as the treatment of children's URTI. However, about two-thirds (67.5%) of the parents were aware of the antibiotic resistance caused by overuse of antibiotics. A significant association was noted between the father's and mother's educational level and family income with the knowledge level. Only mother's educational level depicted a significant association with the attitude.

Conclusion: The knowledge of parents regarding antibiotic usage for URTI was poor. More numbers of health promotions and educational campaigns are required to help parents understand about antibiotic usage.

Keywords

parental knowledge, attitude and practice, antibiotic usage, children's upper respiratory tract infection, primary health care, Malaysia

Introduction

According to the Malaysian National Medicine Use Survey (NMUS) 2007,¹ antibiotics ranked in the first place for a medication item on which the highest amount was spent in 2006 and 2007 consecutively. In addition, antibiotic is the 11th most frequently used medication in Malaysia, with penicillin at the top of the list.

Across the world, the emergence of bacterial strains resistant to antimicrobial agents is becoming more and more severe with time.² Antibiotic resistance is highly associated with the rampant use of antibiotics.³ In primary care clinics, children usually present with respiratory symptoms such as sore throat, which is suggestive of acute tonsillitis or acute pharyngitis, acute otitis media, acute sinusitis, common cold, and acute bronchitis.

These common infections in children are mostly viral and self-limiting, for which antibiotics are most often not necessary. However, globally, more than 50% of children with upper

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respiratory tract infection (URTI) continue to be treated with antibiotics, receiving an average of 2 to 3 prescriptions per year.⁴

Antibiotic abuse in URIs in children is the most common factor leading to antibiotic resistance; thus, the judicious use of antibiotics among children is extremely crucial.⁵ Antibiotic resistance in children is increasingly becoming a major public health problem globally. If this continues, antibiotic, which was once the most effective and inexpensive treatment for URIs, will slowly become less effective or may even cause increased rate of morbidity and mortality among children.⁶

Several local studies conducted in Malaysia have reported that URTI was the most common infections for which antibiotics was prescribed in hospitals; it was as high as 31% and 50% to 55.2% in a primary care setting.^{7,8} Inappropriate prescription of antibiotics from doctors and poor patients' knowledge regarding antibiotic usage and complication has led to an increase in the misuse of antibiotics.⁹ Bella et al¹⁰ reported that only 21.4% of the survey respondents could understand antibiotic usage instructions on the labels, which suggests that the parents' knowledge was far too inadequate. Thus, this global issue needs much greater attention.

The aim of this study was to assess the knowledge, attitude, and practice among parents regarding antibiotic usage for treating URIs in children at a primary health-care clinic as well as to provide further insight into planning intervention programs to combat antibiotic misuse issues.

Materials and Methods

A cross-sectional study was conducted at the Bandar Tasik Selatan Clinic located in the Bandar Tasik Selatan, Kuala Lumpur, on 320 parents between April and July 2015. This clinic is a primary health clinic under the Universiti Kebangsaan Malaysia Medical Center (UKMMC), and the respondents were selected from among parents attending that clinic by a simple random sampling method.

The participants were self-administered with questionnaires consisting of 4 parts with a total of 33 questions: The first part highlighted participant's sociodemographic status such as their gender, race, educational level, working status, and family monthly income. The other sections comprised questions about the knowledge including the source of knowledge and parental knowledge about the antibiotic. The parent is asked to mark the antibiotic that they know and also the indication of antibiotic usage. Third part is about the parents' attitudes toward the antibiotic usage in URTI. We ask the parent about the symptoms and time they see the doctor for the treatment. We also ask the frequency of antibiotic usage by the parent for treating their children, and, finally, about parents' practice regarding the antibiotic usage. One of the questions we asked is about whether the parents are well informed about the antibiotic usage by the doctor. These questionnaires were adopted from those used by Rousounidis et al with some modification. The questions were translated into Malay language, and a pilot study was conducted to ensure its clarity for the participants. A pretest was conducted to validate the questionnaires, with a Cronbach α of .626 for

Table 1. Sociodemographic Characteristics of the Respondents.

Sociodemographic	Frequency	%
Gender of respondents		
Male	83	25.9
Female	237	74.1
Race		
Malay	275	85.9
Chinese	33	10.3
Indian	12	3.8
Father's education		
Primary school	1	0.3
Secondary school	119	37.2
Preuniversity	37	11.6
University	163	50.9
Mother's education		
Primary school	5	1.5
Secondary school	110	34.4
Preuniversity	62	19.4
University	143	44.7
Occupation		
Private	69	21.6
Government	192	60.0
Not working	59	18.4
	Median	Interquartile range (IQR)
Age of respondents, years	32	7
Monthly family income, RM	4125.00	3000.00

knowledge and .769 for attitude. Written-informed consent was obtained from the respondents prior to the study.

The section on knowledge consisted of 7 questions (total score = 7); a score of >4 was considered as good knowledge. Regarding the section on attitude, it consisted of 14 questions (total score = 70); a score of >35 was considered as good attitude, which referred to the parent's will to follow doctor's advice and prescription in the future to treat URTI in their children.

The collected data were analyzed using SPSS (version 20.0). Data analysis was based on bivariate analysis and descriptive analysis. Descriptive analyses were applied by calculating the median and interquartile range (IQR) for continuous variables such as age and family income, while percentages and frequencies were applied for categorical variables. The statistical tests performed included chi-square test, Mann-Whitney *U* test, and Kruskal-Wallis test. $P \leq .05$ was considered statistically significant in 2-tailed tests. This study was approved by the Research and Ethics Committee of UKMMC.

Results

A total of 320 respondents participated in the study. The respondents represented different sociodemographic backgrounds (Table 1). The majority of the respondents were Malay (85.9%), followed by Chinese (10.3%), and Indian (3.8%). Most of the respondents were mothers (74.1%). Almost all fathers (99.7%) and mothers (98.5%) had completed at least secondary school education. Moreover, more than half (60%) of the respondents were government servants. The median age

Table 2. Association of Sociodemographics and Knowledge Level.

	Knowledge		P Value	POR	95% CI
	Poor, n (%)	Good, n (%)			
Gender of respondents					
Female	162 (68.4)	75 (31.6)	.643 ^a	1.138	0.658-1.968
Male	59 (71.1)	24 (28.9)			
Occupation					
Private sector	43 (62.3)	26 (37.7)	.392 ^a	1.052	0.779-1.422
Government Sector	136 (70.8)	56 (29.2)			
Not working	42 (71.2)	17 (28.8)			
Father's educational level					
Low education	98 (81.7)	22 (18.3)	<.001 ^a	2.789	1.620-4.800
High education	123 (61.5)	77 (38.5)			
Mother's educational level					
Low education	92 (80.0)	23 (20.0)	.002 ^a	2.357	1.376-4.035
High education	129 (62.9)	76 (37.1)			
	Median (IQR)	Median (IQR)			
Age, years	32 (8)	32 (6)	.420 ^b		
Family income, RM	4000.00 (2100.00)	5000.00 (4000.00)	.002 ^b		

Abbreviations: POR, prevalence odds ratio; CI, confidence interval; IQR, interquartile range.

^aA chi-square test was performed; level of significance is at $P < .05$.

^bMann-Whitney U test was performed; level of significance is at $P < .05$.

of respondents was 32 years, with an IQR of 7 years, while the median for monthly family income was RM 4125.00 (IQR = RM 3000.00).

Parental Knowledge

Doctors (46.1%) were found to be the main source of information regarding antibiotic usage, followed by Internet (17.5%) and friend (9.6%). Only 25.2% and 21.6% of the parents could correctly identify amoxicillin and penicillin as the most commonly used antibiotics in children's URTI, respectively. Interestingly, many (67.5%) respondents believed that inappropriate usage of antibiotics reduces their efficacy and encourages bacterial resistant, and the majority of the respondents (41.3%) believed that usage of antibiotics has side effects.

The assessment revealed that approximately two-thirds (69.1%) of the respondents had a poor level of knowledge. Table 2 shows the association between respondents' sociodemographic characteristics and knowledge level. A significant association was noted between the knowledge level with the father's educational level (Prevalence Odds Ratio [POR] = 2.79, 95% confidence interval [CI] 1.620-4.800, $P < .001$), mother's educational level (POR = 2.36, 95%CI 1.376-4.035, $P = .002$), and family income ($P = .002$). Poor knowledge level was detected in low-income family as well as for parents with low educational level.

Parental Attitude

The majority of the parents (40.1%) preferred to give antibiotics rather than antipyretics (23.0%) and cough syrup (22.5%) to children with URTI. Only a few of the parents (7.8%) stated

that they did not prefer prescription of antibiotics for their children by the doctor in case of cold and fever. Most of the parents (39.1%) stated that they would never administer antibiotics to their children without doctors' advice, although they did not have spare time to visit pediatrician or did not have sufficient money to pay for the visit. The majority of the parents (37.5%) stated that they always follow pediatrician's advice before prescribing antibiotics to their children, although they believed that their child's condition was not serious.

Generally, 87.5% of the respondents were found to have a good level of attitude regarding antibiotic usage for treating children's URTI. Table 3 shows the association between respondents' sociodemographics and their attitude level, wherein only mother's educational level was found to be significantly associated with their attitude level (POR = 2.19, 95% CI 1.121-4.267, $P = .020$). These results depicted that mothers with higher educational levels had higher attitude level.

Parental Practice

Some of the parents (31.6%) stated that they often asked their doctors whether the prescription of an antibiotic is necessary. A significant association was noted between gender and this practice ($P = .023$). Surprisingly, one-third (32.5%) of the parents completely followed all of the doctors' instructions and advices. There was a significant association between this practice with the gender of the respondents, father's educational level, mother's educational level, and family income ($P = .002$, .001, .001, and <.001, respectively) as shown in table 4. Furthermore, 32.8% of the parents never insisted on their doctors to prescribe antibiotics as a precaution, although the diagnosis was not

Table 3. Association Between Sociodemographics and Attitude Level.

	Attitude		P Value	POR	95% CI
	Poor, n (%)	Good, n (%)			
Gender of respondents					
Female	28 (11.8)	209 (88.2)	.564 ^a	1.262	0.609-2.612
Male	12 (14.5)	71 (85.5)			
Occupation					
Private sector	7 (10.1)	62 (89.9)	.795 ^a		0.665-1.558
Government sector	25 (13.0)	167 (87.0)			
Not working	8 (13.6)	51 (86.4)			
Father's educational level					
Low education	19 (15.8)	101 (84.2)	.163 ^a	1.603	0.823-3.124
High education	21 (10.5)	179 (89.5)			
Mother's educational level					
High education	19 (9.3)	186 (90.7)	.020 ^a	2.187	1.121-4.267
Low education	21 (18.3)	94 (81.7)			
	Median (IQR)	Median (IQR)			
Age, years	31 (5)	32 (7)	.118 ^b		
Family income, RM	4350.00 (2000.00)	4100.00 (3000.00)	.444 ^b		

Abbreviations: POR, prevalence odds ratio; CI, confidence interval; IQR, interquartile range.

^aChi-square test was performed, level of significant is at $P < .05$.

^bMann-Whitney U test was performed, level of significant is at $P < .05$.

confirmed. A significant association between this practice with the gender of the respondents, father's educational level, and family income was noted ($P = .012, .001, \text{ and } .019$, respectively).

Discussion

Knowledge

Our study showed that two-third of respondents had poor knowledge regarding antibiotic usage for treating children with URTIs. Only few parents recognized the most commonly used antibiotics, such as amoxicillin and penicillin, by the doctors for treating URTIs in children. Only 31.9% of the respondents were aware that antibiotics should not be administered to children with URTI because they are of viral origin, which is self-limiting. These results are comparable to studies conducted in Saudi Arabia and Macedonia, which reported 38.5% and 24.2%, respectively, recognized the correct antibiotics to be used in treating URTI.^{11,12} Lack of education about the difference between viral and bacterial infection has caused this misunderstanding, as medical doctors usually use the term "germs" instead of the type of microbial strain. Germ is a layman term usually used by doctors in consulting patients, without clearly stating viral or bacterial infection. Therefore, parents often tend to give antibiotics to treat all kinds of germ infections without acknowledging the underlying causative agents. Antibiotics had been treated as a "wonder drug" by parents for treating all kinds of symptoms.¹³ Based on our research, only one-fifth (23.4%) of the parents acknowledged that antibiotics have side effects, which are much lower than a previous study done in Cyprus that reported 93.0% of respondents knew that antibiotics have side effects.¹⁴ This result

should be given attention, as inappropriate use of antibiotics may cause enhanced antibiotic resistance,⁶ and the parents might end up using antibiotics as the primary prevention treatment for their children with URTI, without knowing the side effects of the antibiotics.

Our results showed that the main source of information about antibiotics are medical doctors (46.1%). This result is similar to that from 2 studies conducted in Saudi Arabia and Cyprus.^{11,14} Although we are living in a high technology and informative era, only a small proportion of parents take initiatives in finding information regarding antibiotics through the Internet. This trend reflects that our population has no interest in accumulating more information about antibiotics. On the other hand, medical doctors have the maximum responsibility in educating the community, as majority of the parents rely on doctors for medical knowledge. Therefore, as a primary prevention step to treat this issue, doctors should spend more time in educating patients. This exercise would definitely enhance the amount of knowledge patient's gain from the consulting doctors.¹⁵

The father's educational level, mother's educational level, and family income were identified as significant factors associated with the knowledge of parent regarding antibiotic usage in treating children's URTI. This result is compatible with those obtained from similar studies conducted in Cyprus, Macedonia as well as Malaysia.¹²⁻¹⁴ We believe that parents with low education level are less exposed to information regarding antibiotics, including their usage, side effects, and indications. Even with well-prepared information regarding antibiotics available on Web site, magazines, or newspapers, less educated parents might find it difficult to comprehend and understand, therefore doctors play an important role in explaining the scenario to them in a simple manner. Moreover, parents

Table 4. Association Between Sociodemographics and Practice Statements.

Question ^a	Sociodemography	Frequency					χ^2	P Value
		Always (%)	Most of the times (%)	Often (%)	Sometimes (%)	Never (%)		
Q29 ^b	Gender of respondents						11.301	.023
	Male	26 (31.3)	22 (26.5)	17 (20.5)	12 (14.5)	6 (7.2)		
	Female	35 (14.8)	79 (33.3)	53 (22.4)	44 (18.6)	26 (11.0)	14.113	.079
	Occupation							
	Private Sector	15 (21.7)	24 (34.8)	13 (18.8)	10 (14.5)	7 (10.1)		
	Government Sector	32 (16.7)	66 (34.4)	48 (25.0)	31 (16.1)	15 (7.8)	2.780	.595
	Not working	14 (23.7)	11 (18.6)	9 (15.3)	15 (15.4)	10 (16.9)		
	Father's education						1.996	.737
	Low education	26 (21.7)	33 (27.5)	26 (21.7)	23 (19.2)	12 (10.0)		
	High education	35 (17.5)	68 (34.0)	44 (22.0)	33 (16.5)	20 (10.0)	2.780	.595
Mother's education								
Low education	26 (22.6)	31 (27.0)	24 (20.9)	22 (19.1)	12 (10.4)	2.780	.595	
High education	35 (17.1)	70 (34.1)	46 (22.4)	34 (16.6)	20 (9.8)			
Q30 ^c	Gender of respondents						12.843	.012
	Male	20 (24.1)	19 (22.9)	10 (12.0)	17 (20.5)	17 (20.5)		
	Female	44 (18.6)	26 (11.0)	59 (24.9)	63 (26.6)	45 (19.0)	11.606	.170
	Occupation							
	Private sector	14 (20.3)	12 (17.4)	15 (21.7)	15 (21.7)	13 (18.8)		
	Government sector	40 (20.8)	28 (14.6)	43 (22.4)	52 (27.1)	29 (15.1)	35.154	<.001
	Not working	10 (16.9)	5 (8.5)	11 (18.6)	13 (22.0)	20 (33.9)		
	Father's education						12.801	.012
	Low education	24 (20.0)	25 (20.8)	6 (5.0)	35 (29.2)	30 (25.0)		
	High education	40 (20.0)	20 (10.0)	63 (31.5)	45 (22.5)	32 (16.0)	12.801	.012
Mother's education								
Low education	24 (20.9)	17 (14.8)	14 (12.2)	29 (25.2)	31 (27.0)	12.801	.012	
High education	40 (19.5)	28 (13.7)	55 (26.8)	51 (24.9)	31 (15.1)			
Q31 ^d	Gender of respondents						17.330	.002
	Male	30 (36.1)	14 (16.9)	9 (10.8)	7 (8.4)	23 (27.7)		
	Female	74 (31.2)	68 (28.7)	37 (15.6)	32 (13.5)	26 (11.0)	11.349	.183
	Occupation							
	Private sector	25 (36.2)	16 (23.2)	9 (13.0)	10 (14.5)	9 (13.0)		
	Government sector	53 (27.6)	58 (30.2)	30 (15.6)	20 (10.4)	31 (16.1)	30.397	<.001
	Not working	26 (44.1)	8 (13.6)	7 (11.9)	9 (15.3)	9 (15.3)		
	Father's education						17.779	.001
	Low education	57 (47.5)	15 (12.5)	20 (16.7)	9 (7.5)	19 (15.8)		
	High education	47 (23.5)	67 (33.5)	26 (13.0)	30 (15.0)	30 (15.0)	17.779	.001
Mother's education								
Low education	49 (42.6)	15 (13.0)	16 (13.9)	14 (12.2)	21 (18.3)	17.779	.001	
High education	55 (26.8)	67 (32.7)	30 (14.6)	25 (12.2)	28 (13.7)			
Q32 ^e	Gender of respondents						12.809	.012
	Male	20 (24.1)	15 (18.1)	6 (7.2)	8 (9.6)	34 (41.0)		
	Female	34 (14.3)	49 (20.7)	42 (17.7)	41 (17.3)	71 (30.0)	4.928	.765
	Occupation							
	Private sector	10 (14.5)	14 (20.3)	9 (13.0)	11 (15.9)	25 (36.2)		
	Government sector	34 (17.7)	37 (19.3)	34 (17.7)	30 (15.6)	57 (29.7)	17.847	.001
	Not working	10 (16.9)	13 (22.0)	5 (8.5)	8 (13.6)	23 (39.0)		
	Father's education						7.537	.110
	Low education	22 (18.3)	28 (23.3)	5 (4.2)	20 (16.7)	45 (37.5)		
	High education	32 (16.0)	36 (18.0)	43 (21.5)	29 (14.5)	60 (30.0)	7.537	.110
Mother's education								
Low education	22 (19.1)	26 (22.6)	9 (7.8)	18 (15.7)	40 (34.8)	7.537	.110	
High education	32 (15.6)	38 (18.5)	39 (19.0)	31 (15.1)	65 (31.7)			

(continued)

Table 4. (continued)

Question ^a	Sociodemography	Frequency					χ^2	P Value
		Always (%)	Most of the times (%)	Often (%)	Sometimes (%)	Never (%)		
Q33 ^f	Gender of respondents							
	Male	21 (25.3)	26 (31.3)	7 (8.4)	14 (16.9)	15 (18.1)	15.551	.004
	Female	55 (23.2)	79 (33.3)	32 (13.5)	59 (24.9)	12 (5.1)		
	Occupation							
	Private sector	17 (24.6)	29 (42.0)	4 (5.8)	16 (23.2)	3 (4.3)	13.860	.085
	Government sector	41 (21.4)	63 (32.8)	29 (15.1)	39 (20.3)	20 (10.45)		
	Not working	18 (30.5)	13 (22.0)	6 (10.2)	18 (30.5)	4 (6.8)		
	Father's education							
	Low education	33 (27.5)	33 (27.5)	9 (7.5)	32 (26.7)	13 (10.8)	8.806	.066
	High education	43 (21.5)	72 (36.0)	30 (15.0)	41 (20.5)	14 (7.0)		
	Mother's education							
	Low education	34 (29.6)	33 (28.7)	12 (10.4)	25 (21.7)	11 (9.6)	4.297	.367
	High education	42 (20.5)	72 (35.1)	27 (13.2)	48 (23.4)	16 (7.8)		

Question ^g	Frequency	Age			Family Monthly Income		
		Median (IQR, years)	Test	P Value	Median (IQR, RM)	Test	P Value
Q29 ^b	Always	32.00 (6)	2.678	.613	4000.00 (3400.00)	8.394	.078
	Most of the time	32.00 (7)			4800.00 (2929.00)		
	Often	32.00 (6)			4000.00 (2000.00)		
	Sometimes	31.00 (8)			4250.00 (4000)		
	Never	33.00 (8)			4000.00 (2375.00)		
Q30 ^c	Always	32.00 (7)	1.975	.740	4125.00 (2000.00)	13.847	.008
	Most of the time	32.00 (9)			4000.00 (.3500.00)		
	Often	33.00 (6)			5000.00 (2500.00)		
	Sometimes	31.00 (7)			4000.00 (3500)		
	Never	32.00 (8)			4000.00 (2150.00)		
Q31 ^d	Always	33.00 (8)	2.848	.584	3500.00 (2450.00)	26.618	<.001
	Most of the time	32.00 (6)			5000.00 (3000.00)		
	Often	34.00 (6)			4000.00 (200.00)		
	Sometimes	31.00 (4)			4000.00 (2500.00)		
	Never	31.00 (7)			4500.00 (2500.00)		
Q32 ^e	Always	34.00 (7)	9.078	.059	4050.00 (2250.00)	11.815	.019
	Most of the time	31.00 (5)			4000.00 (3000.00)		
	Often	33.00 (6)			5000.00 (1875.00)		
	Sometimes	32.00 (7)			4000.00 (3000.00)		
	Never	32.00 (7)			4000.00 (3050.00)		
Q33 ^f	Always	32.00 (8)	4.203	.379	4000.00 (2000.00)	9.817	.044
	Most of the time	33.00 (8)			4500.00 (2500.00)		
	Often	32.00 (7)			4000.00 (4500.00)		
	Sometimes	33.00 (6)			3942.00 (2000.00)		
	Never	31.00 (5)			4000.00 (2500.00)		

Abbreviation: IQR, interquartile range.

^aA chi-square test was performed, level of significant is at $P < .05$.

^bQ29: How often do you ask your pediatrician whether or not the prescription of antibiotics is necessary?

^cQ30: How often do you ask directly your pediatrician to prescribe antibiotics?

^dQ31: How often do you completely follow all the pediatrician's instructions and advice?

^eQ32: How often do you insist on your pediatrician's prescribing antibiotics as a precaution even if any diagnosis is not confirmed?

^fQ33: How often does your pediatrician inform you about your child's disease and notifies you whether it is necessary or not to receive antibiotics?

^gA Kruskal Wallis test was performed, level of significant is at $P < .05$.

with low income tend to have less access to knowledge regarding antibiotics too.

Attitude

With regard to the attitude, most of the respondents showed good attitudes toward antibiotic usage for treating URTI in

children. However, some attitudes still need to be corrected. For instance, the majority of the parents preferred that the doctors prescribe antibiotics for cold and fever, while only few stated that they would never asked doctors to prescribe antibiotics. This result is much higher when compared to the results obtained from a previous study conducted in Penang, Malaysia.¹⁶ The British community also showed the same result as in

Penang research, suggesting that parents prefer prescription of antibiotics for cold and fever.¹⁷ Moreover, we also noted that almost half of the respondents preferred doctors to prescribe antibiotics for their children with URTI. This result was higher when compared to that of a study conducted in Hulu Langat, Malaysia.¹³ Based on the research performed in Saudi Arabia,¹⁸ our result showed that almost three-quarters of the parents believed that antibiotics were needed for treating fever in children with acute URTI. On the other hand, research conducted in Greece reported a much higher percentage when compared to the present study.¹⁹ These researchers showed that most of the parents had a common misperception that most of the cold and fever conditions are responsive to antibiotics and can cure their children without knowing that these conditions are self-limiting. Therefore, to treat these symptoms, parents attend clinics that offer antibiotics. Although the respondents frequently asked for antibiotics, one-third of the respondent continued to get a doctor's advice even when their child's condition was not serious. This attitude showed that most parents are aware that self-prescribed antibiotics is not a feasible option.

The mother's educational level has a significant association with the attitude of parents regarding antibiotics in managing URTI in children. This report is consistent with that by a study conducted in Irbid, Jordan, which showed that the mother's education level influences the attitude of the mother toward managing children with URTI.²⁰ It was not uncommon that most mothers brought their children to seek medical treatment in primary health clinic. Therefore, mothers who are highly educated understand the doctor's explanation better and do not administer antibiotics to their children unnecessarily.

Limitation

There are several limitations in this study. First, this study was conducted in a primary health clinic located in Bandar Tasik Selatan, which is an urban area. Therefore, the result of this study may not represent the trend in the entire Malaysia. To improve on this issue, a larger scale study needs to be performed in different places, including urban and suburban areas, to obtain a diversified study population. The parents included in the study may have had a recall bias, wherein they could not remember the details that were asked in the questionnaires, for example, which was the most recently administered antibiotic to their children with URTI. To overcome this issue, we tracked the preexisting medical records of the patients and the treatment given for URTI.

Conclusions

Knowledge regarding antibiotic usage for treating children's URTI remains lacking even now. However, despite this poor knowledge, most of the parents have an overall good attitude toward antibiotic use. Therefore, parental educational interventions through health promotions and educational campaigns

should be conducted by medical doctors, as they are the main source of information for the parents.

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